WHAT IS CLAIMED IS:

1. A pedestrian collision protection system for a vehicle, comprising:

a collision detecting element fixedly secured to a bumper of a vehicle for detecting a collision against a pedestrian;

a collision site detecting element for detecting a position of a collision site in lateral directions of said vehicle; and

a pedestrian protecting element provided in said vehicle for protecting said pedestrian from the collision according to a pedestrian collision site in said lateral directions at a collision against the pedestrian on the basis of outputs of said pedestrian collision detecting element and said pedestrian collision site detecting element,

wherein said collision detecting element also functions as said collision site detecting element, and includes:

a line sensor composed of a plurality of conductive lines which are separated from each other by a predetermined spacing to confront each other and come into contact with each other when a collision against the pedestrian occurs; and

a detection circuit unit made to carry out the collision detection and the collision site detection on the basis of a variation of quantity of electricity related to an impedance between said plurality of conductive lines.

2. The system according to claim 1, wherein said line sensor includes a plurality of pairs of conductive lines successively arranged in a longitudinal direction of said bumper to detect the collision with the pedestrian independently of each other, and said detection circuit unit makes a decision indicative of the occurrence of a collision when detecting that at least two conductive lines constituting each of said conductive line pairs are brought into contact with each other due to the collision, and makes a decision on a collision site on the basis of a

location of the contact-made conductive line pair which have come into contact with each other.

3. The system according to claim 1, wherein said line sensor includes a pair of conductive lines placed to extend in a longitudinal direction of said bumper and confront each other in a state separated from each other by a predetermined spacing and made to come locally into contact with each other at a position of the collision with the pedestrian and its vicinities, and at least one of conductive lines constituting said conductive line pair includes a resistive line having a resistivity in a numerical range which allows the detection of a current or voltage drop according to the occurrence or non-occurrence of the contact therebetween, and said detection circuit unit detects the collision and the collision site in said lateral directions on the basis of a current flowing in said conductive line pair or a voltage drop in said conductive line pair.

4. The system according to claim 3, wherein said conductive line pair is composed of an electrode line made of a high-conductivity material and a resistive line made of a resistive material having a predetermined resistivity.

5. The system according to claim 3, wherein said conductive line pair are fixedly secured to one of outside and inside surfaces of said bumper.

6. The system according to claim 5, wherein one of said conductive lines is held by one of the other conductive line and said bumper in a state where an elastic member having an electrical insulating property is interposed therebetween.

7. The system according to claim 5, wherein one of said conductive lines has an elasticity whereby said conductive line is restorable to its original position and

is locally deformed by the collision, and is held by one of the other conductive line and said bumper.

8. The system according to claim 5, wherein a power supply source applies a supply voltage through a predetermined voltage drop detection resistive element to between the same-side end portions of said conductive lines constituting said conductive line pair, and said detection circuit unit carries out the detection of the collision and collision site on the basis of a voltage drop across said voltage drop detection resistive element.

9. The system according to claim 4, wherein said electrode line is connected to a first predetermined electric potential source and both ends of said resistive line are connected through different voltage drop detection resistive elements to a second predetermined electric potential source, and said detection circuit unit makes a decision on the collision site on the basis of voltage drops across said voltage drop detection resistive elements.

10. A collision site detecting apparatus for a vehicle, comprising:

a line sensor including at least two conductive lines fixedly secured to one of a front surface and a rear surface of said vehicle and placed to extend in lateral directions of said vehicle in a state separated from each other by a predetermined spacing; and

a detection circuit unit for detecting a quantity of electricity related to an impedance between predetermined positions of both said conductive lines,

wherein at least one of both said conductive lines is made of a resistive material having a predetermined resistivity, and when a collision against a body occurs, the spacing between both said conductive lines is locally elastically reduced at a position of the collision and its vicinities so as to be restorable, and said impedance varies according to the collision position.

11. The apparatus according to claim 10, wherein an alternating-current voltage and a direct-current voltage are applied to said line sensor, and said detection circuit unit makes at least collision detection and collision site detection on the basis of a variation of quantity of electricity related to a direct-current component flowing in said line sensor and detects approach of an obstacle on the basis of a variation of quantity of electricity related to an alternating-current component flowing in said line sensor.

12. A collision position detecting apparatus for a vehicle, comprising:

a line sensor including first and second conductive lines fixedly secured onto a front surface or rear surface of said vehicle to extend in lateral directions of said vehicle and placed to be separated from each other by a predetermined spacing in longitudinal directions of said vehicle, with at least one of said conductive lines being elastically deformed at a position of a collision against a body to be restorable to make an electrical connection with the other conductive line;

a power supply source for applying a voltage to a predetermined position of said first conductive line;

a pair of voltage drop detection resistive elements individually connected between both end portions of said second conductive line and a predetermined constant-potential source; and

a collision position detection circuit unit for discriminating a collision position obtained on the basis of voltage drops across both said resistive elements through the use of an n-bit digital signal,

wherein, when an electrical resistance value per unit distance of said first conductive line in said lateral directions is taken as R1, an electrical resistance value per unit distance of said second conductive line in said lateral directions is taken as R2, an electrical resistance value of both said resistive elements is taken

as R3, R3/R1 is expressed as S, a constant (required resolution/sensor installation width) is taken as dx, and a maximum allowable resistance ratio is taken as T, a resistance ratio (R2/R1) is set to be below T given by the following equation.

$$0 < \frac{R2}{R1} < \frac{(dx + S)\{2^n dxS - (1 - dx) - 2S - S^2\}}{(1 + 2^n S)(1 + 2S)dx} = T$$

$$S = \frac{R3}{R1}$$

where dx : required resolution/sensor installation width

n : voltage read resolution multiplier (number of bits)

13. The apparatus according to claim 12, wherein, when a contact resistance of both said conductive lines at a collision is taken as Rc and Rc/R1 is expressed as C, a resistance ratio (R2/R1) of said conductive lines is set to be below T' given by the following equation.

$$0 < \frac{R2}{R1} < \frac{F(S) + G(S)}{H(S)} = T'$$

$$F(S) = 2^n S[(dx + S)\{(1 + S)S + (1 + 2S)C\} - S\{(dx + S)(1 - dx + S) + (1 + 2S)C\}]$$

$$G(S) = -\{S(1 + S) + C(1 + 2S)\}\{(dx + S)(1 - dx + S) + (1 + 2S)C\}$$

$$H(S) = \{S(1 + 2^n S) + C(1 + 2S)\}(1 + 2S)dx$$

$$S = \frac{R3}{R1}$$

$$C = \frac{Rc}{R1}$$

where dx : required resolution/sensor installation width

n : voltage read resolution multiplier (number of bits)

14. A collision position detecting apparatus for a vehicle, comprising:

a line sensor including first and second conductive lines fixedly secured onto a front surface or rear surface of said vehicle to extend in lateral directions of said vehicle and placed to be separated from each other by a predetermined spacing in longitudinal directions of said vehicle, with at least one of said conductive lines being elastically deformed at a position of a collision against a body to be restorable to make an electrical connection with the other conductive line;

a power supply source for applying a voltage to a predetermined position of said first conductive line;

constant current circuit units individually connected between end portions of said second conductive line and a predetermined constant-potential source; and

a collision position detection circuit unit for determining a collision position on the basis of voltage drops across said constant current circuit units.

15. The apparatus according to claim 14, wherein said collision position detection circuit unit detects a collision position on the basis of a difference in voltage drop between said constant current circuit units individually placed between both said end portions of said second conductive line and said predetermined constant-potential source.